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Date: March 4, 1997

Mr. Randy Jackson
Atlantic Division, Naval Facilities Engineering Command
Environmental Quality Division
Code: 1822
Building N 26, Room 54
1510 Gilbert Street
Norfolk, Va 23511-2699

Re: USN St. Julien Creek Annex, Va.
Sites 2 and 5
Review of the Navy's Draft *RI/FS Work Plan*

Dear Mr. Jackson:

The U.S. Environmental Protection Agency (EPA) has preliminarily reviewed the Navy's draft *Remedial Investigation Work Plan* for Sites 2 and 5, located at the St. Julien Creek Annex (SJCA), and we offer the following comments:

GENERAL COMMENTS

1. The RI/FS Work Plan was assembled with nine major subsections as listed above. However, there is no overall Table of Contents provided and no discussion of document organization. As a result, the document's overall organization is confusing, although within each section, the organization is clear and well organized. The Navy should provide an overall Table of Contents for this document and a brief summary of the sections including the type of information presented in each section.

Draft Final Work Plan

1. The text of the Baseline Ecological Risk Assessment (BERA) is identical between the RI/FS Work Plan for Sites 2 and 5 and the RI/FS Work Plan for Sites 3 and 4. While some general description of a BERA is acceptable, the work scope should also outline specific activities consistent with a site's size, ecology, accessibility and contaminant history.

2. The RI/FS Work Plan does not provide clear objectives for the BERA. Bulleted activities are provided but are not linked to site specific or base wide objectives. Also, the level of ecological assessment is not specified (e.g. screening level or semi-quantitative).
3. The sections of the RI/FS Work Plan relative to the BERA lack many important components and do not adhere to EPA guidance. It is recommended that the RI/FS Work Plan provide specifics on how the following will be accomplished and presented in the BERA Report:
 - problem formulation and conceptual model,
 - source characterization and exposure pathways,
 - exposure assessment,
 - ecological effects characterization, and
 - risk characterization.
4. The RI/FS Work Plan does not provide details on wetland delineation. Will wetland boundaries be surveyed? Will a global positioning system be utilized to map the wetlands for presentation in the RI report? It is recommended that wetlands be delineated with the boundaries mapped to aid in the ecological characterization of all sites.
5. Sampling locations designated as "background" sampling locations are really upgradient or downgradient sampling locations, and do not represent true "background" sampling locations. "Background" sampling is the attempt to establish naturally-occurring inorganic concentrations that are minimally influenced by human activity. Additionally, the establishment of naturally-occurring background concentrations is accomplished statistically and, for soil, is accomplished per soil classification. The draft *Work Plan* does not attempt to do this. Attached, please find a section of the Radford Army Ammunition Plant Work Plan describing an acceptable methodology for establishing facility-wide naturally-occurring background concentrations.
6. It was indicated on page 4-9 of the draft *Final Work Plan* and *Sampling and Analysis Plan* that surface soil samples would be collected at depths of 0 to 0.5 feet below ground surface (bgs). On page 2-2 of the draft final *Quality Assurance Project Plan*, it was indicated that surface soil samples would be collected at depths of 0 to 0.25 feet bgs. This discrepancy should be clarified. The EPA BTAG recommends that surface soil samples be collected at 0 to 0.25 ft. bgs. for use in ecological risk assessments.
7. The number of surface water and sediment samples to be collected and the proposed sampling locations are given on page 4-12 of the draft final *Work Plan* and *Sampling and Analysis Plan*. It was indicated that four surface water (two from each site) would be collected from areas of ponded water, drainage ditches, or streams adjacent to each site. Sediment samples will be collected at corresponding locations. The section requires a more thorough description of sampling locations by clearly depicting the exact locations. If for any

reason, this should be accomplished so that the contractor knows where to take the samples. Also, this information is needed to determine whether the proposed sampling locations are sufficient to characterize the nature and extent of contamination in the site media. As written, it does not appear that a sufficient number of sampling locations have been chosen to characterize potential site-related contamination.

8. The EPA BTAG recommend that sampling be extended to St. Julien Creek and Blows Creek. It is understood that these creeks may have been impacted by other areas of contamination. This, however, does not negate the need to determine whether Sites 2 and/or 5 have potentially contributed to the contamination of these creeks. Although sampling in the drainage way above the confluence of St. Julien Creek will help determine whether contaminants are leaving Site 2 via this route, there may be other routes of contamination that will not be addressed. From Figure 3-1, it appears that there is a potential for surface water runoff from Site 2 to directly discharge to St. Julien Creek.
9. On page 4-21 of the draft final *Work Plan* and *Sampling and Analysis Plan*, it was indicated that the ecological risk assessment will follow EPA's guidance in the 1989 manual "Risk Assessment Guidance for Superfund Volume II: Environmental Evaluation Manual". The EPA BTAG recommends that the ecological risk assessment guidance developed by the EPA's Environmental Response Team, dated 1994, be utilized instead (copy enclosed).

Draft Final Field Sampling Plan

1. The number of surface water and sediment samples currently proposed are adequate only for a screening level ecological risk assessment where only the maximum detected concentrations are compared to ecological benchmarks. Without additional sampling, it will be difficult to characterize the extent of contamination and develop reasonable ecological exposure pathways. Since the RI/FS Work Plan does not specify the level of ecological risk assessment to be performed, it is recommended that the sampling regime be re-evaluated once the ecological problem formulation is enhanced.
2. A tiered approach for additional sediment sampling should be presented in the RI/FS Work Plan and should include Simultaneously Extracted Metals and Acid Volatile Sulfide (SEM/AVS) analysis to assist with the bioavailability assessment of inorganic contaminants, specifically divalent metals if these are found to be Contaminants of Concern.
3. The following field data should be collected for sediments: temperature, Eh, pH, conductivity, and Munsell color. In the current Draft Final Field Sampling Plan, only pH is proposed.
4. All surface water samples should be analyzed for alkalinity, hardness, BOD,

COD, total suspended solids, and total dissolved solids. The Draft Final Field Sampling Plan only proposes that surface water samples be analyzed for hardness. Also, the hardness method proposed, EPA Method 130.1, does not also provide an alkalinity result.

5. The sample designation scheme does not appear to consider multiple rounds at the same sampling location. It is recommended that the sample number explanation be expanded to include the maintenance of unique sample designations in the event of multiple rounds of the same media at the same sampling location.

SPECIFIC COMMENTS

Draft Final Work Plan

1. Page 1, Introduction, Landfill B

Review of historic aerial photography of the SJCA may depict Landfill B as encompassing an area larger than just the corner of St. Julien Drive and Craddock Street. 1937 aerial photography depicts a disturbed area directly east of the "Landfill B" area, on the opposite side of the drainage way leading towards St. Julien Creek (i.e. south of Building 130). This disturbed area also has lettering labeled as "HI-X" as viewed from the air, which may indicate waste-ordnance disposal activities. It is suggested that the area of investigation for Landfill B be expanded to include both sides of the drainage way. Additionally, aerial photography depicts significant activity occurring at the Landfill B area after the reported closing date of the landfill in 1947. In fact, significant ground disturbance and filling activities occur on both sides of the Landfill B drainage way in both 1964 and 1974 aerial photography.

2. Page 1, Introduction, Burning Grounds

A review of historic aerial photography of SJCA reveals some significant indications that more than one burning ground/EOD range may have been present at the facility. This is especially true during the time period before 1940. No significant disturbed areas are noted at SJCA north of Blows Creek and east of Craddock Street before 1940, where the current location of the Burning Ground is depicted (i.e. south of Building 272 and northeast of Building 35). However, two other locations have significant disturbance indicative of burning ground operations in the 1930-1940 time frame, as seen in historic aerial photography. One location is north of Blows Creek and west of Craddock Street, near Buildings 179 and 181 (i.e. along Marsh Road). The second area is located behind what is currently Building 251. As found at Landfill B, this second location also has lettering labeled as "HI-X" as seen from the air in 1937 aerial photography, which may be indicative of waste ordnance disposal activities.

The current location of the "Burning Grounds", i.e. Site 5, is well defined in 1949 aerial photography. Even the "caged pit" is depicted in 1949. The boundaries of the Site 5 "Burning Ground" should be expanded to include the caged pit(s) area. A review of 1958 aerial photography shows significant digging and trenching operations in the Burning Ground vicinity that should also be included in the investigation. Historic information states that explosives testing was conducted at building 282, located at the burning ground. Also, it is believed that building 23 was or is located near the "caged pit". Immediately east of the current burning grounds boundary was building 296 which was referred to as the "pyrotechnics burning facility". Thus, chemicals associated with pyrotechnics should also be analyzed for at the burning ground.

3. Figure 4

-The boundaries of the Landfill B should be expanded to include both sides of the drainage way.

-The referenced "background" samples should be re-designated as "upgradient" sampling locations. Also, the depicted "background" sampling locations may not be appropriate background sampling locations as aerial photography depicts ground scarring at the Building 1556 location as far back as 1937.

4. Figure 5

The "background" sampling locations depicted on Figure 5 should be designated as "upgradient" sampling locations. Also, as depicted, the background sampling locations lie within the boundaries of the burning ground (Site 5), and should be re-located north -northwest of Building 272.

5. Figure 4-1

The boundaries of Landfill B should be expanded to include areas on both sides of the drainage way leading to St. Julien Creek. Also, given that the ground disturbance depicted in 1937 aerial photography south of Building 130 had the lettering "HI-X" visible from the air, it is recommended that an ordnance "sweep" of this area be performed before intrusive activities occur in the vicinity of this area.

6. Page 4-4, Monitoring Well Installation, Landfill B

An additional shallow monitoring well is recommended to be installed on the eastern side of the drainage way at Landfill B, south of Building 130.

7. Page 4-4, Geophysical Survey Techniques, Burning Ground

The geophysical survey of the burning ground should attempt to locate the following:

- caged pit(s) as depicted in 1949 aerial photography
- excavated areas as depicted in 1958 aerial photography, extending from Building 272 to southwest of Building 35.
- trench running north to south depicted in 1958 aerial photography, located northeast of Building 272.
- row of rectangular excavations situated west of a solitary tree as depicted in 1964 aerial photography. The excavations are located east-southeast of Building 35.
- large pit containing liquid depicted in 1974 aerial photography. The pit is situated northeast of Building 272.
- Ground disturbance at the termination of dirt road leading from Building 272 and looping around east-southeast towards Blows Creek. The activity occurs in 1986 aerial photography.

8. Figure 4-2

Given the extent of historic activity seen in aerial photography of the SJCA, the boundaries of the Burning Grounds (i.e. Site 5) may not be adequately depicted in the figure. Extensive activity has occurred in the immediate vicinity, but outside the boundaries as currently drawn. Please review the aerial photography and expand the boundaries of the Burning Ground as appropriate.

9. Figure 4-2

"Background" samples locations depicted on Figure 4-2 should be re-designated "upgradient" sampling locations. Also, given the extent of historical ground disturbance in the burning ground vicinity, it is recommended that any upgradient sampling locations be re-located to the north-northeast of Building 272.

10. Page 4-4, Monitoring Well Installation, Burning Ground

Additional monitoring wells may be needed at the Burning Ground, given the extent of historic activities depicted at the Burning Ground and the fact that the boundaries of the Burning Ground may need to be expanded. Specific comment No. 7 alludes to some of the significant activities seen in the general vicinity of the current Burning Ground over time.

11. Page 4-7, Groundwater Sampling, Groundwater Sample Numbers and Location

This section indicates that samples for both total and dissolved metals will be collected and analyzed. A brief discussion of the filtering procedure to be followed should be included in the Groundwater Sampling Techniques section. A more thorough discussion of the field filtering techniques should be included in the Sampling and Analysis Plan.

12. Page 4-8, Table 4-1

The Table notes indicate that trip blanks for volatile analysis will be collected at a frequency of 1 per cooler of volatile samples. It is recommended that separate trip blanks be used to monitor contamination of groundwater samples since groundwater samples will be analyzed for low concentration volatiles. Routine volatile analysis of trip blanks will not be adequate to monitor contamination of low concentration volatile samples.

13. Page 4-9, Soil Sampling

The number of soil samples at Sites 2 and 5 may increase given the probable expansion of the boundaries of Sites 2 and 5 because of the apparent extent of historic activities which occurred at these Sites over time.

14. Page 4-9

The site description for Site 5 indicates several sources of potential oil contamination at this site. The Navy should consider expanding the sampling and analyses to include Total Petroleum Hydrocarbon analysis in both soils and groundwater in order to identify the extent of oil contamination and determine if the contamination has seeped into the groundwater.

15. Page 4-9

The site description for Site 5 indicates the presence of transformers and large circuit breakers at this site. The Navy should consider expanding the sampling and analyses to include PCB analysis of the oil in the transformers and circuit breakers in order to characterize them prior to any removal and disposal activities associated with the transformers and circuit breakers.

16. Page 4-12, Landfill B

The text in the draft Work Plan states, "The eastern part of [site 2] is water covered and appears to drain into St. Julien Creek to the south." No surface water or sediment sampling is currently proposed for St. Julien Creek. It is recommended that additional surface water and sediment samples be collected from wetlands in the eastern part of Site 2 and that a tiered sampling approach be specified in the RI/FS Work Plan outlining the decision process that will be used to determine when sampling from St. Julien Creek is warranted.

17. Page 4-18 & 4-19, Risk Assessment

This section states that the future use of the site is expected to remain industrial. The Navy should elaborate on the reasons why future residential development is not expected at SJCA. However, EPA recommends that both scenarios be utilized in the risk assessment process. This allows for an appropriate evaluation as to whether site restrictions are necessary, i.e. whether

or not long-term monitoring is required at any particular site. Additionally, the calculation of both residential and industrial scenarios is important in the development of the Feasibility Study. The decision to evaluate groundwater as a potential drinking water is appropriate.

18. Page 4-18, Task 5: Risk Assessment. Steps outlined for the Baseline Human Health Risk Assessment seem thorough and include testing of the data distribution. The Navy has indicated that previous data will be validated and combined with new data to be collected in this study. The Navy should evaluate the size of the data set to be certain that enough samples are collected to complete the data set and to provide a statistically valid risk evaluation.

19. Page 4-20, Table 4-3

The text states that the future use of the site is expected to remain industrial. EPA recommends that both scenarios be utilized in the risk assessment process. This allows for an appropriate evaluation as to whether site restrictions are necessary, i.e. whether or not long-term monitoring is required at any particular site. Additionally, the calculation of both residential and industrial scenarios is important in the development of the Feasibility Study.

20. Page 4-21, Paragraph 1

The discussion of uncertainty is to be site specific and should include a qualitative analysis of any COPCs that could not be evaluated quantitatively.

Page 4-21 Comments Related to Ecological Assessment Problem Formulation

21. It is recommended that the RI/FS Work Plan specify the assessment and measurement endpoints that will focus the ecological characterization.
22. The RI/FS Work Plan should either specify receptors for exposure studies or set criteria for the selection of ecological receptors.
23. The second and third bullets should include the collection and presentation of information on feeding habits and habitat preferences of inventoried species.

Page 4-21 Comments Related to Ecological Effects Assessment

24. The RI/FS Work Plan does not specify whether risk to ecological receptors will be assessed in a qualitative or quantitative manner. It is recommended that the eighth bullet item be expanded to specify the level of risk assessment (screening level, semi-quantitative level or quantitative level). If a tiered or phased approach is planned, then the decision points leading to the next level need to be specified in the RI/FS Work Plan.
25. Please clarify the fifth and sixth bullet items by clearly specifying how

contaminants of potential ecological concern (COPCs) will be selected. Will the COPC selection process entail a comparison to EPA Region III BTAG screening levels, with contaminants detected at concentrations exceeding a screening level being selected as a COPC? The fifth bullet item appears to conflict with the sixth bullet item. Generally environmental effects quotients (EEQs) are calculated as part of a Tier 1 screening level ecological assessment. The sixth bullet appears to indicate that EEQs will be utilized in the COPC selection process. It is recommended that COPCs be selected by comparison with EPA Region III screening levels and that EEQs are calculated on COPCs in the first phase of the BERA. The RI/FS Work Plan should specify the denominator per medium that will be used in the EEQ calculation.

26. It is recommended that the work scope specify that the ecological toxicity profiles for contaminants of potential concern will be provided in the BERA. The toxicity profiles should include a recent literature review.
27. The RI/FS Work Plan should specify if there is potential that site specific toxicity tests may be performed. It is recommended that the performance of toxicity tests be outlined in a tiered approach.
28. The methods for ecological field investigations should be specified. For example, will the 1987 Corps Method be used for wetland delineation?

Page 4-21 Comments Related to Ecological Risk Characterization

29. It is recommended that the RI/FS Work Plan specify that a weight of evidence approach will be taken when comparing estimated exposure point concentrations with toxicity data, toxicity reference values, and ecological observations.
30. The RI/FS Work Plan should specify that an uncertainty section specific to the ecological assessment will be included in the ecological risk assessment report.

Draft Final Sampling and Analysis Plan

1. **Table 2-3**

This table, outlining holding times and preservation requirements, is correct, but should be expanded to indicate that samples for dissolved metals must be filtered prior to preservation.

Draft Final Field Sampling Plan

1. It is reported that various burning operations occurred at the burning grounds. It is appropriate to include dioxin as an analytical parameter at sites where

solvents could have been burned. Additionally, the various explosives burned, tested, or demilitarized at the burning ground may have contained various plasticizers and additives that are also toxic. Examples include metriol trinitrate, triethylene glycol dinitrate, resorcinol, ethyl centralite, PBNA, and stryrene. Additionally, desensitizing chemicals were also utilized at burning grounds, such as triacetin, which are also toxic. This should be kept in mind when developing a sampling and analysis plan for the burning ground. Also, in line with Specific Comment # 2, samples obtained from the burning ground should also be analyzed for chemicals associated with pyrotechnics, including phosphorus and strontium.

2. Page 1-8, Field Sampling Plan

The Field Sampling Plan specifies that sediment samples will be analyzed for Total Organic Carbon (TOC). However, no method reference is provided. EPA Region III recommends that all sediment samples be analyzed for TOC with results reported as percent organic matter, and for grain size distribution by the ASTM method for hydrometer or emery tube. In addition, the laboratory reports from the TAL/TCL analyses of the sediment samples should specify percent moisture or percent solids

This concludes EPA's preliminary review of the Navy's draft *Remedial Investigation Work Plan* for Sites 2 and 5, located at the SJCA. If you have any questions regarding the above, please feel free to call me at (215) 566-3357,

Sincerely,



Robert Thomson, P.E, AEP
Office of Superfund

cc: Devlin Harris (VDEQ, Richmond)
(NAVBASE, Code N4)
Barbara Okorn (USEPA, 3HW41)